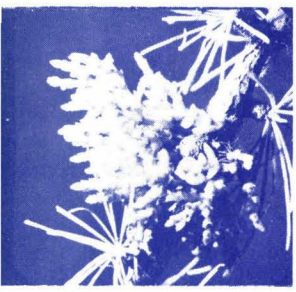
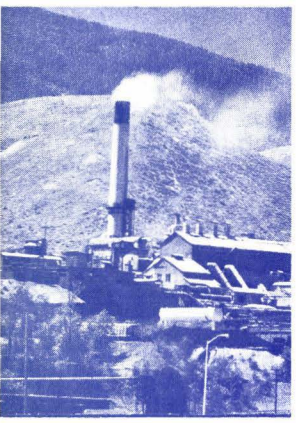
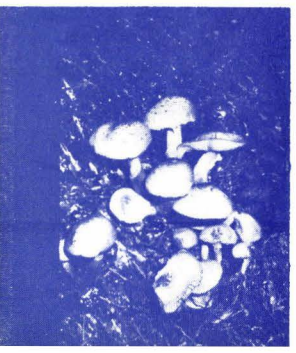
SB761
47N6
#78-3







FOREST INSECT & DISEASE MANAGEMENT

USDA · FOREST SERVICE · NORTHERN REGION

State & Private Forestry · Missoula, MT 59801

Report No. 78-3

5200
January 1978

DAMAGE CAUSED BY THE DOUGLAS-FIR TUSSOCK MOTH ON PORTIONS OF THE NEZPERCE NATIONAL FOREST 1977

by

Wayne E. Bousfield, Entomologist, and
Robert D. Oakes, Biological Technician

LIBRARY
MAR 21 1978
ROCKY MOUNTAIN STATION

INTRODUCTION

The Douglas-fir tussock moth, Orgyia pseudotsugata McDunnough, caused 23,000 acres of aerially visible defoliation on the Nezperce National Forest and adjacent private lands in 1973. Severe defoliation occurred on 20 small areas near Riggins, Idaho. Defoliated areas were characterized by sharply defined margins with no visible damage occurring more than a few chains from the perimeters. This unique defoliation pattern provided an opportunity to compare effects on radial growth in defoliated areas and nondefoliated areas.

METHODS

This study was initiated in 1975 (Bousfield and Ward 1976). Two areas (Lucile and Race Creek) were selected for ground evaluations (Fig. 1). Variable plots of basal area factor (BAF) 40 were used to sample both damaged and undamaged portions of the same area. Ten plots in each stand were sampled on a 5- by 5-chain grid. The diameter of each sample tree was measured to the nearest 0.1 inch and height to the nearest foot. Trees were classified as to amount of damage still visible from the 1973 defoliation. Increment cores were obtained from each tree and the last 10 years measured to calculate periodic annual growth. Habitat type was recorded for each plot. The data were analyzed by using R-1 computer program "INDIDS."

RESULTS

The effect of the 1973 defoliation was still evident in 1977. Surviving trees that were heavily defoliated in 1973 still had thin crowns and were classified as light or moderate defoliation in 1977

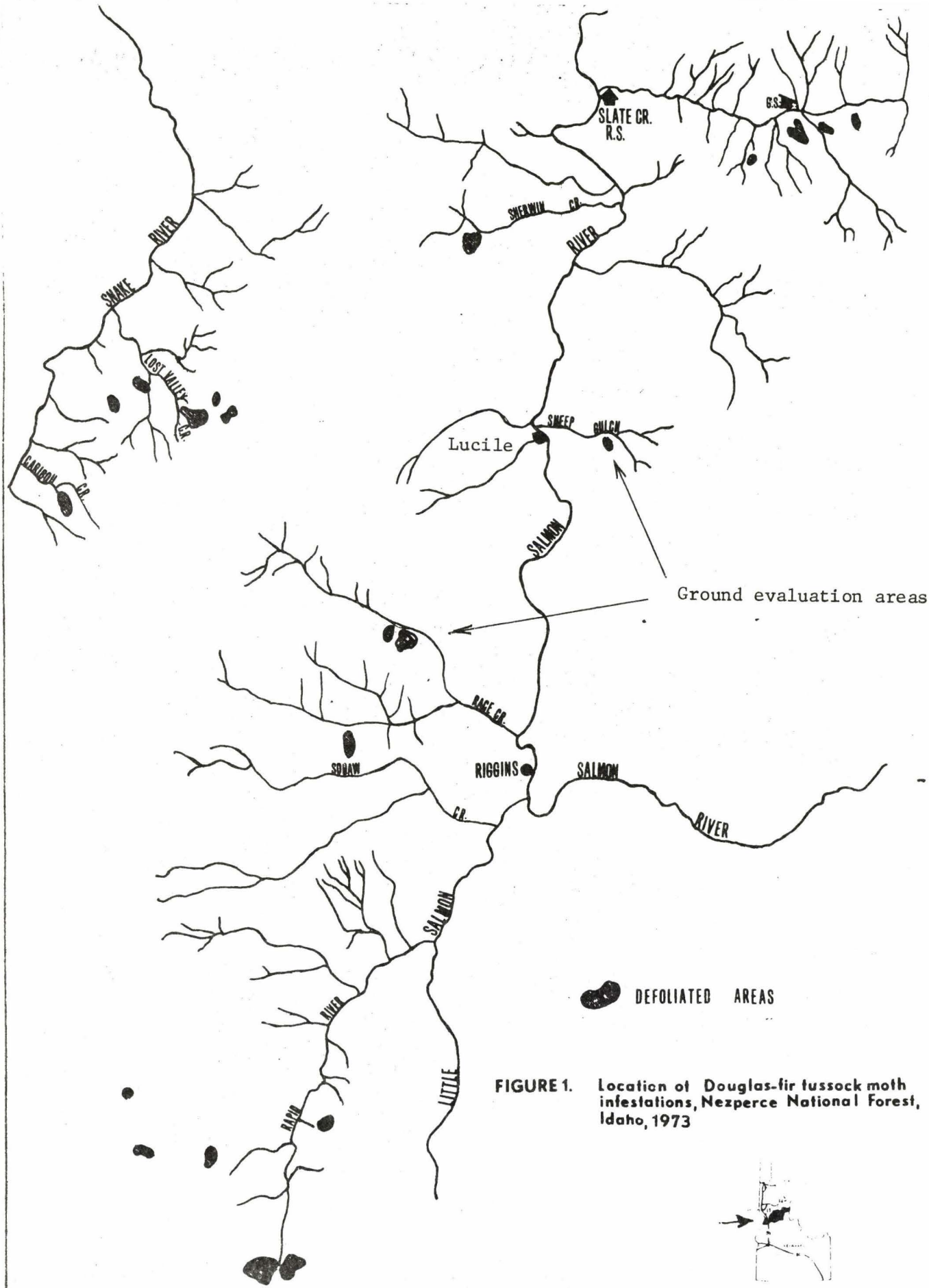


FIGURE 1. Location of Douglas-fir tussock moth infestations, Nezperce National Forest, Idaho, 1973

although no defoliation had occurred since 1973. Some trees displayed top killing and others were dead. The Lucile area had the least mortality with only 1.1 percent of the cubic foot volume killed by tussock moth defoliation. In 1975 it was estimated that 16.8 percent was killed. Evidently many trees in the Lucile area were not completely dead in 1975 and recovered. However, in Race Creek tree mortality increased from 17.6 percent of the volume in 1975 to 39.7 percent in 1977. Buprestids and some Douglas-fir beetle were active in Race Creek and accounted for most of the mortality in the weakened trees (table 1).

Table 1.--Percent of cubic foot volume by damage class, area, and year evaluated

Area	Damage class					
	Undamaged stand	Defoliation			Top kill	Mortality
		Light	Moderate	Heavy		
	1977 EVALUATION					
	Percent of volume					
Race Cr. defoliation	37.6	25.3	0	0	2.3	39.7
Race Cr. check	100.0	0	0	0	0	0
Lucile defoliation	31.7	60.8	6.3	0	0	1.1
Lucile check	100.0	0	0	0	0	0
	1975 EVALUATION					
Race Cr. defoliation	10.5	11.6	29.5	30.8	0	17.6
Race Cr. check	100.0	0	0	0	0	0
Lucile defoliation	0	0	4.0	79.2	0	16.8
Lucile check	100.0	0	0	0	0	0

Period annual increment (PAI) was computed for each stand in 1977 (table 2).

Table 2.--Periodic annual increment in damaged and nondamaged areas

Area	Cubic feet/acre
Race Cr. defoliation	65.88
Race Cr. check	71.94
Lucile defoliation	68.33
Lucile check	88.71

Differences in PAI are due to mortality and reduced growth caused by defoliation. Habitat types are the same; however, the damaged areas may have a lower site index.

CONCLUSION

The Douglas-fir tussock moth caused considerable damage to isolated, pure Douglas-fir stands near Riggins, Idaho, in 1977. Most of the damage occurred on steep slopes in the Douglas-fir/ninebark habitat type. Tree mortality was significant in one of the two areas evaluated. Most of the trees in the "light" and "moderate" defoliation classes examined in 1975 have recovered; however, a large number in the "heavy" defoliated class have died. Growth reduction occurred, and damaged areas have not recovered to full production.

LITERATURE CITED

Bousfield, Wayne E., and James D. Ward. 1976. Observations of impact on the Nezperce National Forest caused by the Douglas-fir tussock moth. USDA, Forest Service, State and Private Forestry, Missoula, Montana 59807.